

ABSTRACT OF THE DISCLOSURE

Energy efficient transmissive and transreflective display devices are described. Ambient light from a natural or artificial source is used to replace and/or supplement light normally supplied by a backlight. This is done by directing ambient light to the rear of a transmissive display panel. A window, light tunnel, or a reflective surface located in the rear or top of a display device may be used to direct the ambient light to the back of the display panel. A translucent diffuser and/or diffuse reflector are used to diffuse the ambient light to reduce the chance of bright spots appearing on the display. Additional energy efficiency is achieved by using one or more photo-sensors to detect the amount of light, incident on the front and/or rear of a display panel and by automatically adjusting the backlight intensity as a function of photo-sensor output. In this manner, backlight intensity can be minimized while maintaining the viewability of images shown on the display. In such an embodiment, energy savings are achieved as compared to devices which use fixed backlight intensity settings in a variety of light conditions. Control of the power supplied to a display's backlight in accordance with the present invention can reduce electrical energy consumption and prolong the amount of time a portable device can be used before its batteries need to be recharged.